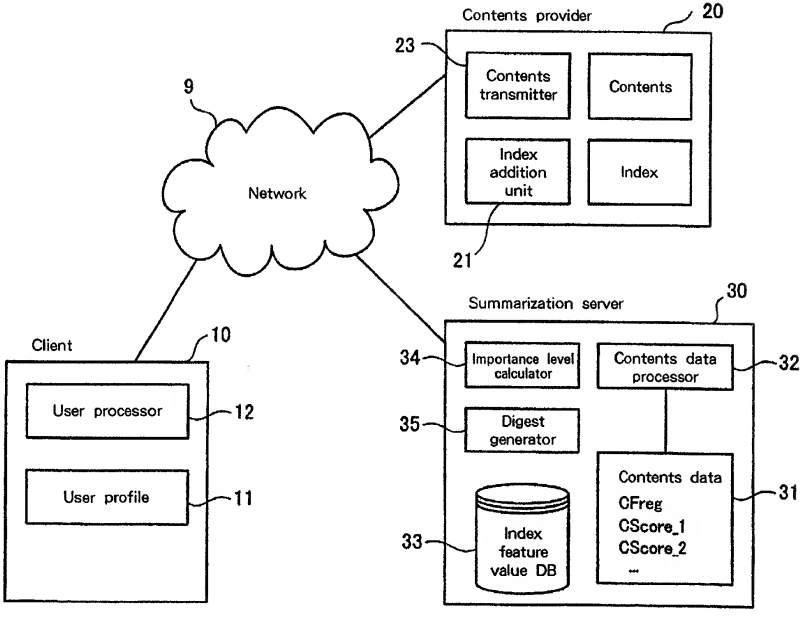

Contents provider
20
23
Contents transmitter
Contents
Index addition unit
Index
21
9
Network
Summarization server
30
Client
10
34
Importance level calculator
Contents data processor
32
35
Digest generator
User processor
12
User profile
11
Contents data
CFreg
CScore_1
CScore_2
...
31
33
Index feature value DB

Fig. 1

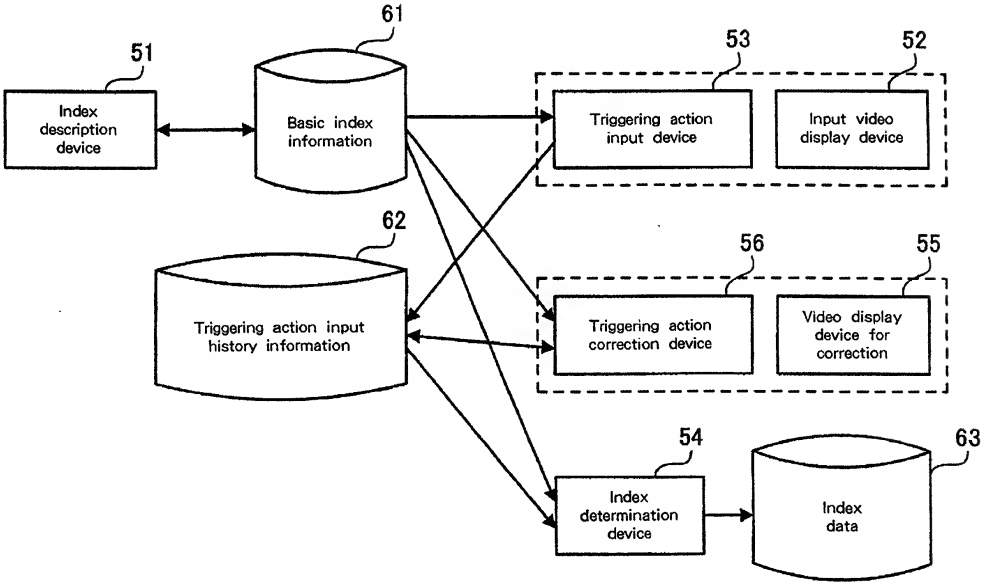

61
51
53
52
Index description device
Basic index information
Triggering action input device
Input video display device
62
56
55
Triggering action input history information
Triggering action correction device
Video display device for correction
54
63
Index determination device
Index data

Fig. 2

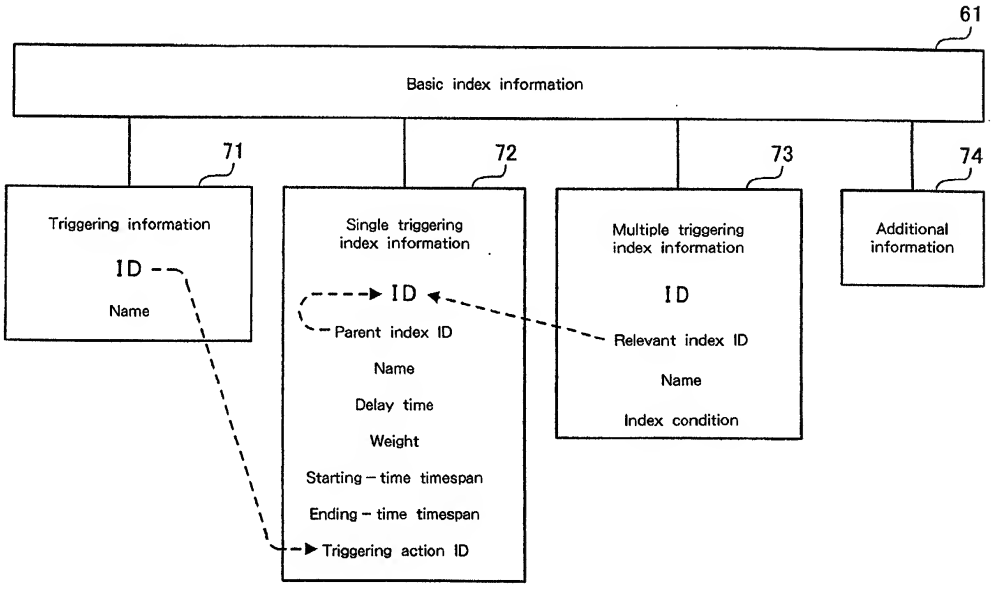
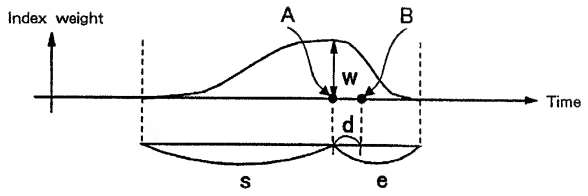

61
Basic index information
71
72
73
74
Triggering information
ID
Name
Single triggering index information
ID
Parent index ID
Name
Delay time
Weight
Starting – time timespan
Ending – time timespan
Triggering action ID
Multiple triggering index information
ID
Relevant index ID
Name
Index condition
Additional information

Fig. 3

(a) Case wherein video preceding a triggering action is regarded as important



A : Occurrence of a triggering action
B : Input by an index adding person

d : delay time
s : starting – time timespan
e : ending – time timespan
w : weight

(b) Case wherein video following a triggering action is regarded as important

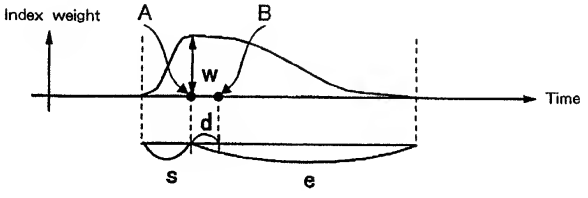


Fig. 4

Triggering information

71-1

ID	Name
1	Pass
2	ThroughPass
3	Centering
4	Shoot
5	CornerKick

Multiple triggering index information

73-1

ID	Refer ID	Name	Condition
1	5	CornerGoal	6 (<10s) 5
2	4	ThroughShoot	2 (<3s) 4

Additional information

74-1

ID	Name
1	TeamA
2	TeamB

Single triggering index information.

72-1

ID	Parent ID	Name	Weight	Delay	Start	End	Trigger
1	–	Pass	1	0	2s	0.5s	1
2	1	ThroughPass	2	0	2s	0.5s	2
3	1	Centering	2	0	2s	0.5s	3
4	–	Shoot	3	0	1s	0.5s	4
5	4	Goal	4	0	1s	0.5s	5
6	–	CornerKick	2	0	0.5s	4s	6

Fig. 5

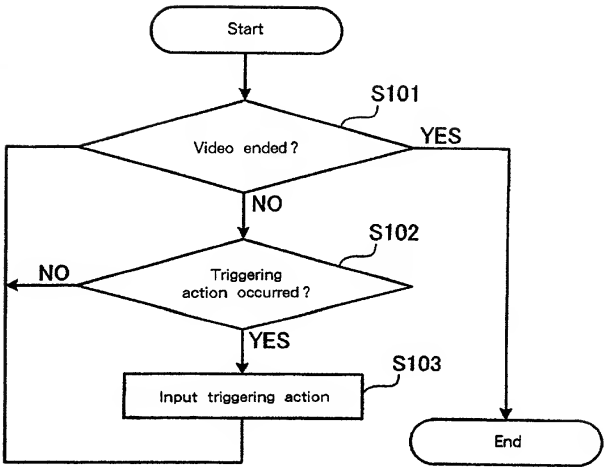

Start
S101
Video ended?
YES
NO
S102
NO
Triggering
action occurred?
YES
S103
Input triggering action
End

Fig. 6

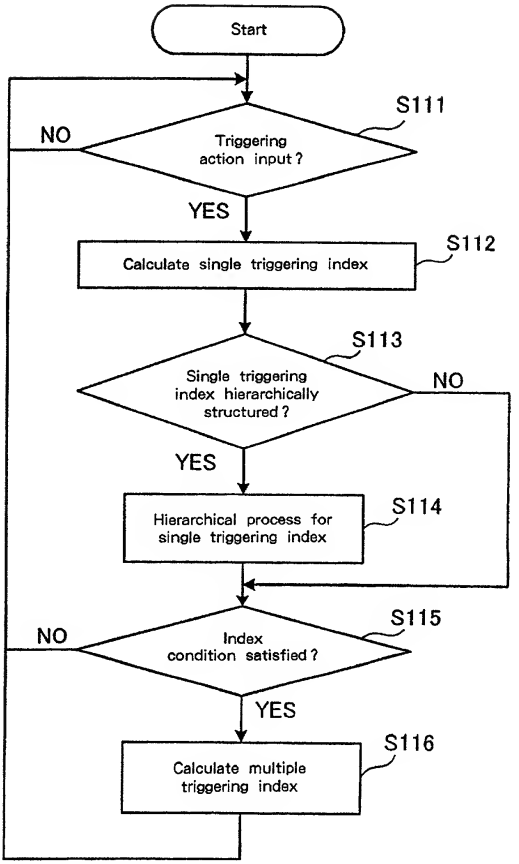

Start
S111
NO
Triggering action input ?
YES
S112
Calculate single triggering index
S113
Single triggering index hierarchically structured ?
NO
YES
S114
Hierarchical process for single triggering index
S115
NO
Index condition satisfied ?
YES
S116
Calculate multiple triggering index

Fig. 7

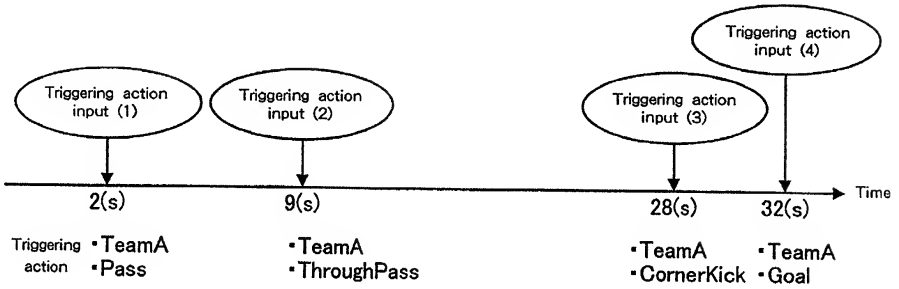
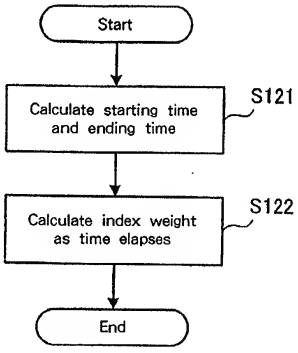
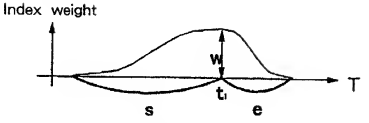

Triggering action input (1)
Triggering action input (2)
Triggering action input (3)
Triggering action input (4)
Time
2(s)
9(s)
28(s)
32(s)
Triggering action
•TeamA
•Pass
•TeamA
•ThroughPass
•TeamA
•CornerKick
•TeamA
•Goal

Fig. 8

(a)



(b)



s : starting – time timespan
e : ending – time timespan
w : weight
t_1 : time whereat a triggering action was input

(c) Index weight calculation expressions

when $t <= t_1$

$$f(t) = w * \exp\left\{ \frac{-(t - t_1)^2}{2\sigma_s^2} \right\}$$

(σ_s is a solution of $t = t_1 - s, f(t) = \varepsilon$)

when $t > t_1$

$$f(t) = w * \exp\left\{ \frac{-(t - t_1)^2}{2\sigma_e^2} \right\}$$

(σ_e is a solution of $t = t_1 + e, f(t) = \varepsilon$)

Fig. 9

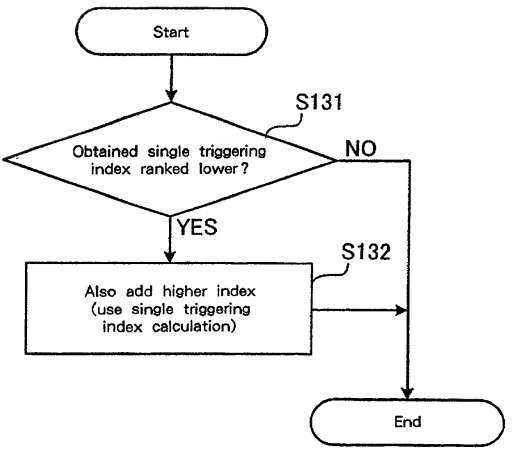

Start
S131
Obtained single triggering index ranked lower?
NO
YES
S132
Also add higher index (use single triggering index calculation)
End

Fig. 10

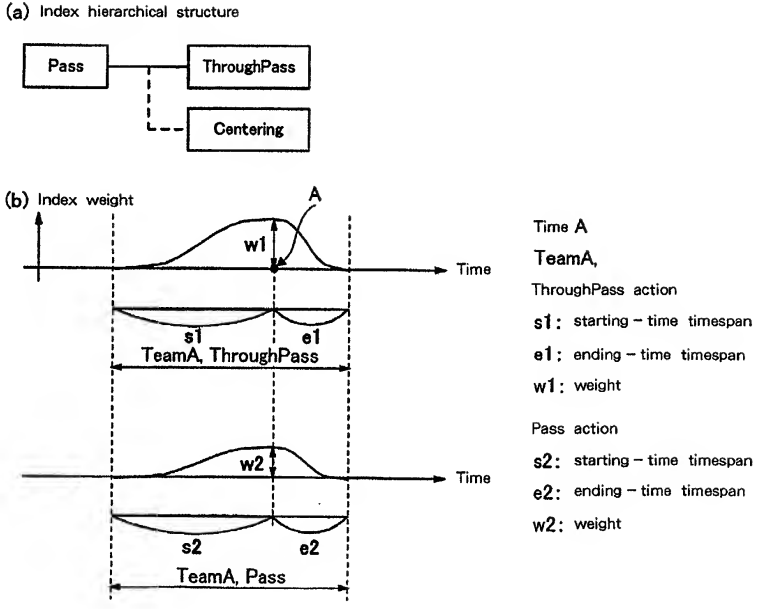
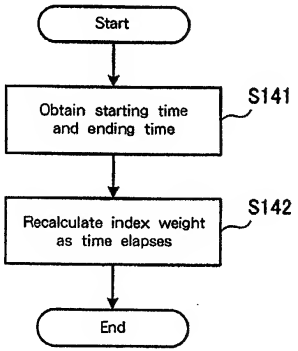
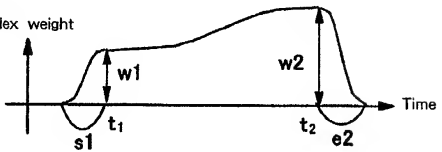

(a) Index hierarchical structure
Pass
ThroughPass
Centering
(b) Index weight
A
w1
Time
s1
e1
TeamA, ThroughPass
w2
Time
s2
e2
TeamA, Pass
Time A
TeamA,
ThroughPass action
s1: starting – time timespan
e1: ending – time timespan
w1: weight
Pass action
s2: starting – time timespan
e2: ending – time timespan
w2: weight

Fig. 11

(a)



(b)



(c) Index weight calculation expressions

when $t <= t_1$

$$f(t) = w1 * \exp\left\{\frac{-(t-t_1)^2}{2\sigma_s^2}\right\}$$

(σ_s is a solution of $t = t_1 - s1,\ f(t) = \varepsilon$)

when $t_1 < t <= t_2$

$$f(t) = w1 + (w2-w1) * \exp\left\{\frac{-(t-t_2)^2}{2\sigma_m^2}\right\}$$

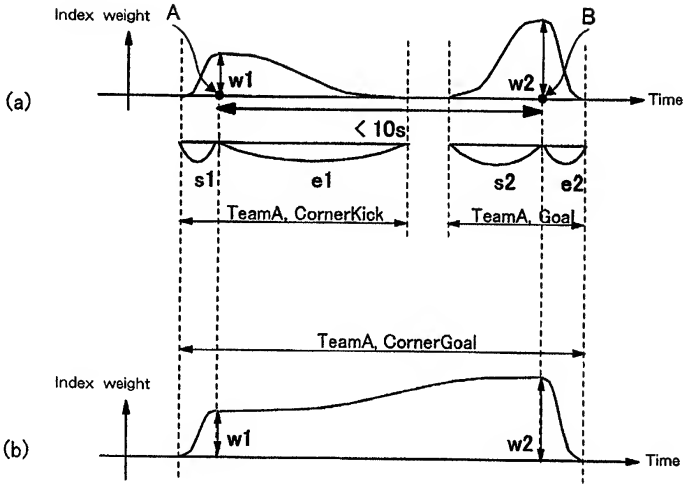
(σ_m is a solution of $t = t_1,\ f(t) = w1+\varepsilon$)

when $t > t_2$

$$f(t) = w2 * \exp\left\{\frac{-(t-t_2)^2}{2\sigma_e^2}\right\}$$

(σ_e is a solution of $t = t_2 + e2,\ f(t) = \varepsilon$)

Fig. 12



Time A
TeamA,
CornerKick action
s1 : starting – time timespan
e1 : ending – time timespan
w1 : weight

Time B
TeamA,
Goal action
s2 : starting – time timespan
e2 : ending – time timespan
w2 : weight

Fig. 13

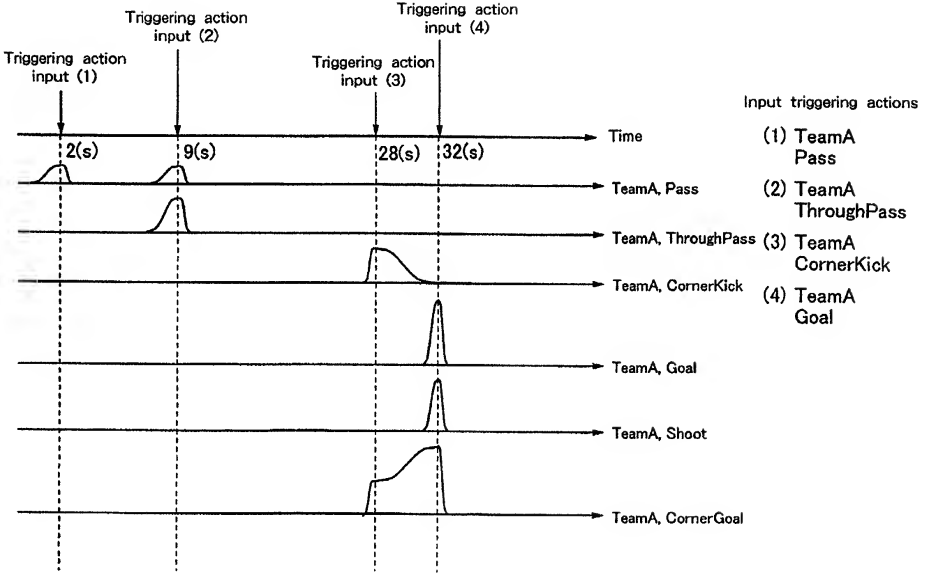

Triggering action input (1)
Triggering action input (2)
Triggering action input (3)
Triggering action input (4)
2(s)
9(s)
28(s)
32(s)
Time
TeamA, Pass
TeamA, ThroughPass
TeamA, CornerKick
TeamA, Goal
TeamA, Shoot
TeamA, CornerGoal
Input triggering actions
(1) TeamA Pass
(2) TeamA ThroughPass
(3) TeamA CornerKick
(4) TeamA Goal

Fig. 14

Triggering information

ID	Name
1	Walk
2	Run
3	Kick
4	Head

71-2

Multiple triggering index information

ID	Refer ID	Name	Condition
–	–	–	–

73-2

Additional information

ID	Name
1	TeamA
2	TeamB

74-2

ID	Name
1	PlayerA1
2	PlayerA2
3	PlayerB1
4	PlayerB2

Single triggering index information

ID	Parent ID	Name	Weight	Delay	Start	End	Trigger
1	–	Walk	1	0	0.5s	5s	1
2	–	Run	2	0	0.5s	5s	2
3	–	Kick	2	0	0.5s	2s	3
4	–	Head	3	0	0.5s	2s	4

72-2

Fig. 15

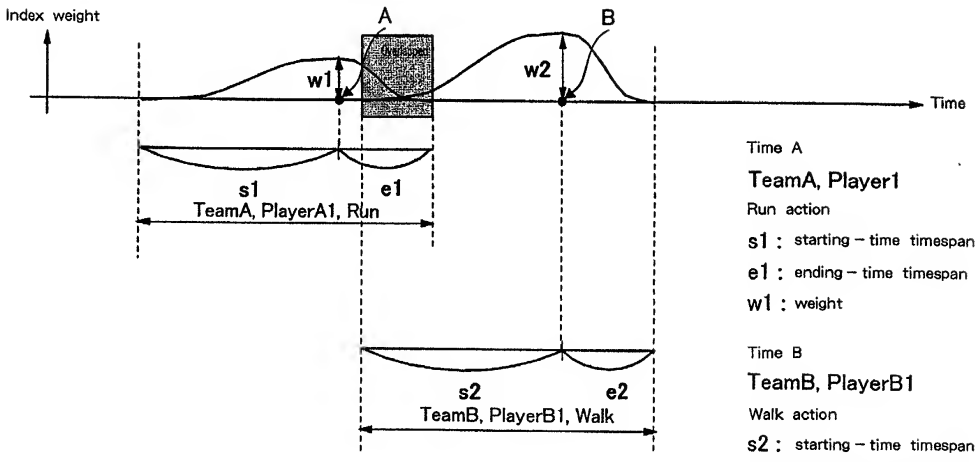

Index weight
A
B
w1
w2
Time
s1
e1
TeamA, PlayerA1, Run
s2
e2
TeamB, PlayerB1, Walk
Time A
TeamA, Player1
Run action
s1 : starting – time timespan
e1 : ending – time timespan
w1 : weight
Time B
TeamB, PlayerB1
Walk action
s2 : starting – time timespan
e2 : ending – time timespan
w2 : weight

Fig. 16

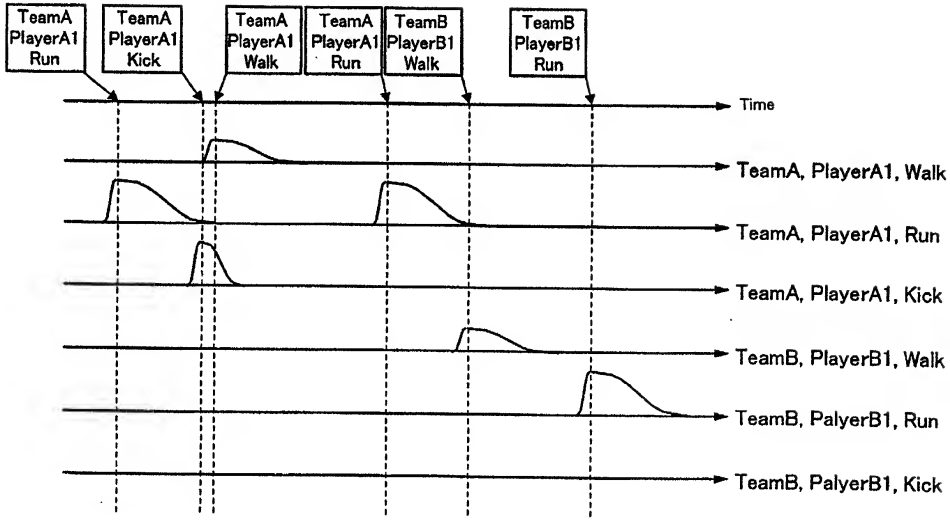
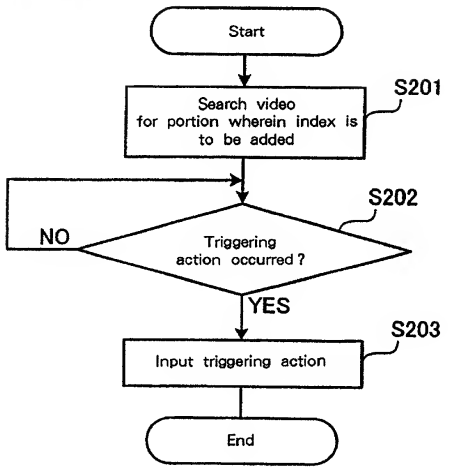

TeamA PlayerA1 Run
TeamA PlayerA1 Kick
TeamA PlayerA1 Walk
TeamA PlayerA1 Run
TeamB PlayerB1 Walk
TeamB PlayerB1 Run
Time
TeamA, PlayerA1, Walk
TeamA, PlayerA1, Run
TeamA, PlayerA1, Kick
TeamB, PlayerB1, Walk
TeamB, PalyerB1, Run
TeamB, PalyerB1, Kick

Fig. 17

(a) Index addition



(b) Index deletion

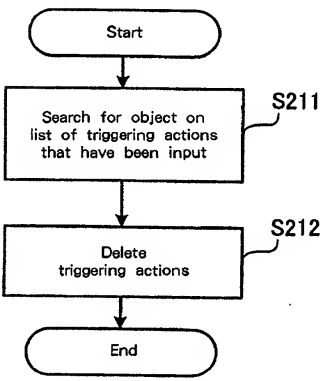


Fig. 18

Searched in Japio

Index correction

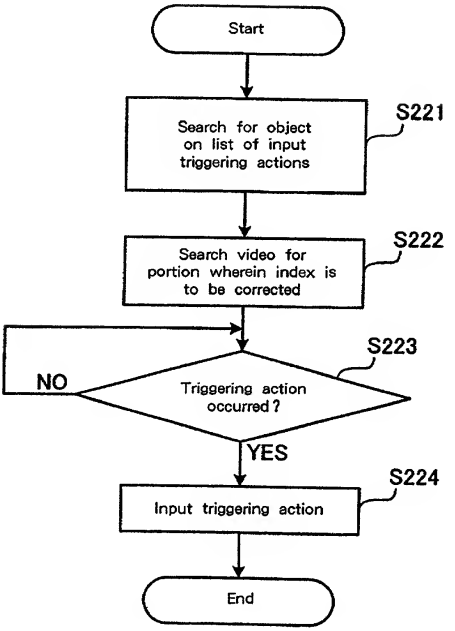


Fig. 19

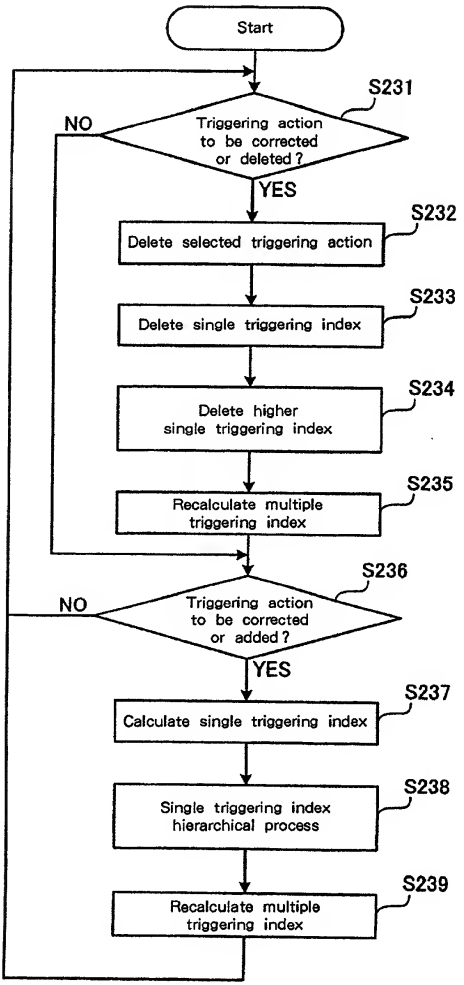

Start
S231
NO
Triggering action to be corrected or deleted?
YES
S232
Delete selected triggering action
S233
Delete single triggering index
S234
Delete higher single triggering index
S235
Recalculate multiple triggering index
S236
NO
Triggering action to be corrected or added?
YES
S237
Calculate single triggering index
S238
Single triggering index hierarchical process
S239
Recalculate multiple triggering index

Fig. 20

Triggering information

ID	Name
1	Strike
2	Ball
3	Swing
4	Foul
5	Hit
6	Homerun

71-3

Multiple triggering index information

ID	Refer ID	Name	Condition
1	4	MFoul	3 4
2	6	MHomerun	3 6

73-3

Additional information

ID	Name
1	TeamA
2	TeamB

74-3

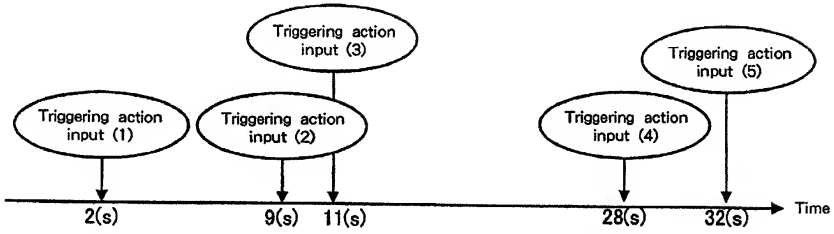
ID	Name
1	PlayerM
2	PlayerT
3	PlayerH

Single triggering index information

ID	Parent ID	Name	Weight	Delay	Start	End	Trigger
1	–	Strike	1	0	2s	0.5s	1
2	–	Ball	1	0	2s	0.5s	2
3	–	Swing	1	0	2s	0.5s	3
4	1	Foul	2	0	3s	1s	4
5	–	Hit	3	0	4s	2s	5
6	5	Homerun	4	0	4s	2s	6

72-3

Fig. 21



Input triggering actions

(1) TeamA,PlayerM Ball

(2) TeamA,PlayerM Swing

(3) TeamA,PlayerM Foul

(4) TeamA,PlayerM Swing

(5) TeamA,PlayerM Homerun

Fig. 22

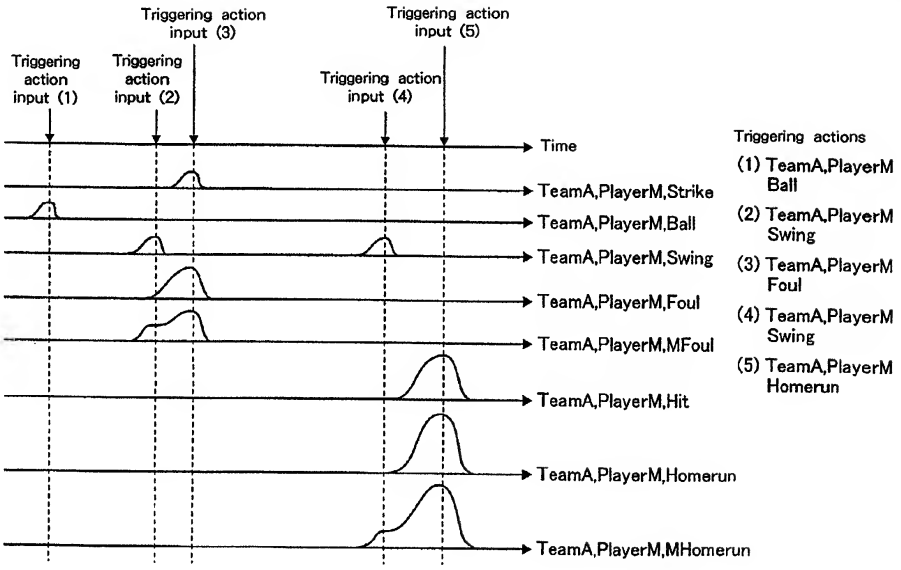

Triggering action input (1)
Triggering action input (2)
Triggering action input (3)
Triggering action input (4)
Triggering action input (5)
Time
TeamA,PlayerM,Strike
TeamA,PlayerM,Ball
TeamA,PlayerM,Swing
TeamA,PlayerM,Foul
TeamA,PlayerM,MFoul
TeamA,PlayerM,Hit
TeamA,PlayerM,Homerun
TeamA,PlayerM,MHomerun
Triggering actions
(1) TeamA,PlayerM Ball
(2) TeamA,PlayerM Swing
(3) TeamA,PlayerM Foul
(4) TeamA,PlayerM Swing
(5) TeamA,PlayerM Homerun

Fig. 23